AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for operating a solid state power control (SSPC) device to control a multiple-phase electrical load for a multiple-phase power source, comprising:

triggering respective phases of the multiple-phase electrical load to switch on or off in such a manner that:

each ~~switching at least one~~ phase of the ~~multiple-phase~~ electrical load is triggered according to ~~on or off at~~ a zero-crossing point for a corresponding phase of the multiple-phase power source, and

at least one of the phases of the electrical load is triggered according to a zero-crossing toward a positive amplitude of a corresponding phase of the power source, while another of the phases of the electrical load is triggered according to a zero-crossing toward a negative amplitude of a corresponding phase of the power source.

2. (Currently Amended) The method according to claim 1, further comprising:

generating, for each voltage phase of the power source, a digital pulse waveform whose rising and falling edges occur at zero-crossing points for the voltage phase, wherein the ~~switching~~ triggering step uses at least one of the edges of each digital pulse waveform to trigger a corresponding phase of the electrical load to be switched-on.

3. (Currently Amended) The method according to claim 2, wherein the ~~switching~~ triggering step is performed in response to a switch-on command received by the SSPC device.

4. (Currently Amended) The method according to claim 3, wherein the ~~switching~~ triggering step ~~switches on~~ causes each phase of the electrical load to be switched on within a predetermined time after a first one of the phases of the electrical load is switched on.

5. (Currently Amended) The method according to claim 4, wherein the predetermined time ~~is substantially equal~~ corresponds to ½ cycle of a phase of the electrical load.

6. (Currently Amended) The method according to claim 5, wherein

the electrical load is a three-phase electrical load,

the power source is a three-phase power source, and

the generating step includes,

generating a first, second and third digital pulse waveform for the first, second and third voltage phases of the power source, respectively;

inverting the third digital pulse waveform, and

the ~~switching~~ triggering step includes;

using the rising edge of the first and second digital pulse waveform to trigger a first and second phase of the electrical load, respectively, to be switched-on; and

using the rising edge of the inverted third digital pulse waveform to trigger a third phase of the electrical load to be switched-on.

7. (Currently Amended) The method according to claim 3, further comprising:

~~switching-on one of the phases of the electrical load at an arbitrary time,~~ if the phase of the electrical load has not been triggered by a digital pulse waveform ~~to be switched-on~~ within a predetermined time after the switch-on command is received by the SSPC device, switching-on one of the phases of the electrical load at an arbitrary time,

______wherein the predetermined time is equal to at least ½ cycle of the phase of the electrical load.

8. (Currently Amended) The method according to claim 1, further comprising:

generating, for each current phase of the power source, a digital pulse waveform whose rising and falling edges occur at zero-crossing points for the current phase, wherein the ~~switching~~ triggering step uses at least one of the edges of the digital pulse waveform to trigger a corresponding phase of the electrical load to be switched-off.

9. (Currently Amended) The method according to claim 8, wherein the ~~switching~~ triggering step is performed in response to a switch-off command received by the SSPC device.

10. (Currently Amended) The method according to claim 9, wherein

the electrical load is a three-phase electrical load,

the power source is a three-phase power source, and

the generating step includes,

generating a first, second and third digital pulse waveform for the first, second and third current phase of the power source, respectively;

inverting the third digital pulse waveform, and

the ~~switching~~ triggering step includes;

using the rising edge of the first and second digital pulse waveform to trigger a first and second phase of the electrical load, respectively, to be switched-off; and

using the rising edge of the inverted third digital pulse waveform to trigger a third phase of the electrical load to switched-off.

11. (Currently Amended) The method according to claim 9, further comprising:

~~switching-off one of the phases of the electrical load at an arbitrary time,~~ if the phase of the electrical load has not been triggered by a digital pulse waveform to be switched-off within a predetermined time after the switch-off command is received by the SSPC device, switching-off one of the phases of the electrical load at an arbitrary time,

______wherein the predetermined time is equal to at least ½ cycle of the phase of the electrical load.

12. (Currently Amended) A solid state power control (SSPC) device for controlling a multiple-phase electrical load of a multiple-phase power source, comprising:

one or more power switching devices (PSDs)~~, each of which is~~ configured to trigger respective phases of the multiple-phase electrical load to switch on or off in such a manner that:

each ~~switch a~~ phase of the ~~multiple-phase~~ electrical load is triggered according to ~~on or off at~~ a zero-crossing point of a corresponding phase of the ~~variable frequency~~ multiple-phase power source, and

at least one of the phases of the electrical load is triggered according to a zero-crossing toward a positive amplitude of a corresponding phase of the power source, while another of the phases of the electrical load is triggered according to a zero-crossing toward a negative phase of a corresponding phase of the power source.

13. (Currently Amended) The SSPC device according to claim 12, further comprising:

multiple PSDs corresponding to the multiple phases of the electrical load; and

a power switching controller operably connected to the PSDs, wherein the power switching controller is configured to convert each phase of the power source to a triggering signal for controlling a corresponding one of the PSDs.

14. (Original) The SSPC device according to claim 13, wherein the power switching controller includes,

one or more zero-crossing detection devices, each of which is configured to receive a waveform corresponding to a phase of the power source, and to convert the received waveform into a digital pulse waveform whose rising and falling edges occur at zero-crossing points for the received waveform.

15. (Currently Amended) The SSPC device according to claim 14, wherein the power switching controller further includes,

~~one or more~~ multiple control devices, each of which is configured to receive the digital pulse waveform from an operably connected zero-crossing detection device as the triggering signal for a corresponding PSD, wherein the control device is triggered by a rising edge of the received triggering signal to control the PSD to switch the respective phase of the electrical load on or off.

16. (Currently Amended) ~~The~~ A solid state power control (SSPC) device ~~according to claim 15~~ for controlling a multiple-phase electrical load of a multiple-phase power source, comprising:

one or more power switching devices (PSDs), each of which is configured to switch a phase of the multiple-phase electrical load on or off at a zero-crossing point of a corresponding phase of the variable frequency multiple-phase power source;

a power switching controller operably connected to the PSDs, wherein the power switching controller is configured to convert each phase of the power source to a triggering signal for controlling a corresponding one of the PSDs,

wherein the power switching controller includes:

one or more zero-crossing detection devices, each of which is configured to receive a waveform corresponding to a phase of the power source, and to convert the received waveform into a digital pulse waveform whose rising and falling edges occur at zero-crossing points for the received waveform, and

one or more control devices, each of which is configured to receive the digital pulse waveform from an operably connected zero-crossing detection device as the triggering signal for a corresponding PSD, wherein the control device is triggered by a rising edge of the received triggering signal to control the PSD to switch the respective phase of the electrical load on or off, and

wherein at least one of the control devices is configured to receive, and be triggered by, an inverted digital pulse waveform of the operably connected zero-crossing detection device.

17. (Original) The SSPC device according to claim 15, wherein each control device is configured to:

receive a command signal, and

be triggered by the rising edge of the triggering signal, which is received after the command signal, to control the corresponding PSD to switch the respective phase of the electrical load on or off.

18. (Original) The SSPC device according to claim 17, wherein

the electrical load is a three-phase electrical load and the power source is a three-phase power source,

the power switching controller includes

a first, second and third zero-crossing detection devices configured to receive a waveform corresponding to a first, second and third phase of the power source, respectively, and to convert the received waveform into a first, second and third digital pulse waveforms, respectively, wherein the third digital pulse waveform is inverted; and

first, second and third control devices operably connected to the first, second and third zero-crossing detection devices, respectively, wherein the third control device is triggered by a rising edge of the inverted third digital pulse waveform.

19. (Original) The SSPC device according to claim 17, wherein the power switching controller includes,

fail-safe logic configured to trigger each of the control devices to control the corresponding PSD to switch the respective phase of the electrical load on or off at an arbitrary time, if the control device has not received a rising edge of the triggering signal within a predetermined time after the command signal, wherein the predetermined time is equal to at least ½ cycle of the respective phase of the electrical load.

20. (Original) The SSPC device according to claim 15, wherein the power switching controller includes an application specific integrated circuit (ASIC) operably connected to each PSD, wherein the ASIC includes the zero-crossing detection device and control device for controlling the PSD.

21. (Currently Amended) The SSPC device according to claim 15, wherein

at least one of the zero-crossing detection devices is a voltage zero-crossing detector configured to receive a waveform corresponding to a voltage phase of the power source, and to convert the received waveform into a digital pulse waveform, and

the control device, ~~circuit,~~ which is operably connected to the voltage zero-crossing detector, is triggered to control the corresponding PSD to switch-on the respective phase of the electrical load.

22. (Currently Amended) The SSPC device according to claim 15, wherein

at least one of the zero-crossing detection devices is a current zero-crossing detector configured to receive a waveform corresponding to a current phase of the power source, and to convert the received waveform into a digital pulse waveform, and

the control device, ~~circuit,~~ which is operably connected to the current zero-crossing detector, is triggered to control the corresponding PSD to switch-off the respective phase of the electrical load.